

## TITLE OF INVENTION

Aerial Exercising Device and Method

## CROSS REFERENCE TO RELATED APPLICATION

Not Applicable

## STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable

## REFERENCE TO SEQUENCE LISTING

Not Applicable

## BACKGROUND OF INVENTION

[0001] The present invention relates, in general, to exercise devices and methods. This invention relates more particularly to an aerial or suspended exercise device enabling users to achieve vertical jumping and bounding, horizontal movement, and suspended exercise movements to achieve exercise positioning, including upright, horizontal, seated, and supine, etc.

[0002] Exercise apparatus for use in a workout facility are well known in the art. However, the current equipment used for the average person seeking muscular and aerobic workout are fairly restricted to floor or ground placement, thereby restricting the amount of equipment available at one facility or location due to space requirements. In the majority of workout facilities, the vertical spaces of the structure is of little or no use to the exerciser or user of the workout equipment placed on the floor throughout the building or structure.

[0003] Devices for suspending an exercising individual for limited aerial aerobatics is well known in the art. U.S. Patents Nos. 4,052,070 and 4,125,257 disclose two such

devices. Both devices rely on a mechanical advantage achieved by the use of a complicated system of pulleys and cables. These devices require the user to have considerable strength and athletic ability. Further, the complicated mechanical systems do not lend themselves to quick assembly and disassembly. These devices are more suitable for gymnastics-type exercises such as are ordinarily achieved through the use of flying rings but not necessarily usable by the average person seeking to perform aerobic training exercises. Other aerial exercise devices that include pelvic harnesses are disclosed by U.S. Pat. Nos. 2,107,377 and 3,432,163. These devices, for the most part, limit the range of exercises to tumbling and gymnastic maneuvers that can be accomplished through their use. U.S. Pat. No. 3,519,239 discloses a simple device to be used by a child which includes means for storing and reusing the energy of the child as he moves in a vertical plane. A simple bounding or bouncing motion is all that may be achieved through use of this device.

[0004] Accordingly, it is an object of the present invention to alleviate the above-described problems and shortcomings of the exercise devices heretofore available to people who exercise. Therefore, a device which provides the versatility of working in multi-planar directions and does not require significant amounts of athletic strength and agility, and does not require any gymnastic technique would be a useful device to the average person seeking an aerobic workout. Furthermore, the present invention does not require excessive amount of floor or ground space since the workout area is defined to be vertical and aerial spaces and multi-planar directions which minimize floor and ground space needed.

## BRIEF SUMMARY OF INVENTION

[0005] In an exemplary embodiment of the invention, a user performs functional tasks during training or exercise using the exercise device. The exercise device has an upper frame which supports the various workout stations. The first workout station includes a harness assembly that is worn by the user. The harness assembly is located substantially beneath the upper frame and is connected to the upper frame by at least one resilient

member, such as, but not limited to, a spring or a hydraulic device, in which the resilient member have a predetermined vertical extension tension force. The resilient member has a first end connected to the harness assembly and a second end connected to the upper frame. There could be a line connected to the first harness system to enable a spotter to aid the user in jumping vertically. The second workout station includes a harness assembly that is worn by the user and is located substantially beneath the upper frame. The harness assembly is connected to at least one flexible line which has one end connected to the harness assembly by at least one harness connectors and the other end passes through a pulley system attached to the upper frame by the frame connectors or attached to the upper frame by a sliding system. The flexible line is operatively disposed to the pulley system or the sliding system whereby said flexible line aerially suspends the user in a horizontal position and allows a horizontal planar movement on a vertical surface. The flexible line extends to the floor and is operatively disposed to another pulley system whereby a spotter can pull the flexible line to aid the user up the vertical surface. The third workout station includes a cradle system comprising a seat and back rest. The seat may be composed of a different material than that of the back. The cradle system supports the user substantially beneath the upper frame. At least one vertical member is attached to the cradle system and connected to the upper frame by the frame connectors. An elastic cord connects the flexible back to the upper frame by the connectors. Handles, such as but not limited to, flying rings, are located next to the seat. A vertical member connects to the handle and connects to the upper frame. The handle may be connected to the vertical member connected to the seat of the cradle system.

[0006] The exercise device of the current invention is further directed to a method of exercising and allows the user to perform functional exercises. The first step is to put the first harness assembly on the user. The second step is to attach the first end of the resilient members to the harness assembly. With the user located beneath the upper frame, the third step is to attach the second end of the resilient members to the upper frame. The user is now secured by the harness assembly and resilient members and may now perform functional exercises, such as but not limited to, side-lunges, 2-and-1 legged lunges, reverse lunges, frog jumps, sumo dead lifts, knee lifts, mid-air hand-to-toe

touches and other exercise programs as might be designed by one skilled in the art. The fourth step is to put the second harness assembly on the user. The fifth step is to attach the first end of the flexible line to the harness assembly. With the user located beneath the upper frame, the sixth step is to operatively dispose the flexible line to the pulley systems connected to the upper frame and to the pulley system connected to the floor. The user is now secured by the harness assembly and flexible line and may now be pulled up the vertical surface by a spotter and perform functional exercises, such as but not limited to, an aerobic workout by running horizontally back and forth across the vertical surface while the spotter pulls on the ends of the flexible line performs a seated row exercise. The seventh step is to attach the vertical member to the cradle system. The eighth step is to attach the elastic cord to the flexible back. The ninth step is to attach the handles to the vertical members. The tenth step is to attach the vertical members and the elastic cord to the upper frame. With the cradle system located beneath the upper frame, the user can now securely be seated in the cradle system and perform functional exercises, such as but not limited to, various abdominal exercises.

[0007] Advantages and novel features of the present invention will become apparent to those skilled in the art from the following detailed description, which simply illustrates various modes and examples contemplated for carrying out the invention. As will be realized, the invention is capable of other different aspects, all without departing from the invention. Accordingly, the drawings and descriptions are illustrative in nature and not restrictive.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0008] So that the manner in which the above recited features, advantages and objects of the present invention are attained and can be understood in detail, a more particular description of the invention, briefly summarized above, may be had by reference to the embodiments thereof which are illustrated in the appended drawings.

[0009] It is to be noted, however, that the appended drawings illustrate only typical

embodiments of this invention and are therefore not to be considered limiting of its scope, for the invention may admit to other equally effective embodiments. While the specification concludes with claims particularly pointing out and distinctly claiming the present invention, it is believed that the same will be better understood from the following description, taken in conjunction with the accompanying drawings, in which:

[0010] FIG. 1 is a perspective view of an exemplary embodiment of an exercise device made in accordance with the present invention;

[0011] FIG. 2 is a partial, exploded view of an exemplary embodiment of an exercise device of the first harness system made in accordance with the present invention;

[0012] FIG. 2A is a partial, exploded view of the assembly resilient members to the beam and stopper plate;

[0013] FIG. 3 is a partial, exploded view of an exemplary embodiment of an exercise device of the second harness system made in accordance with the present invention;

[0014] FIG. 3A is a partial, exploded view of the alternative sliding system as part of the beam;

[0015] FIG. 4 is a partial, exploded view of an exemplary embodiment of an exercise device of the cradle system with the handles system made in accordance with the present invention;

[0016] FIG. 5 is a partial, perspective view similar to that of FIG. 2 showing a user of the exercise device;

[0017] FIG. 6 is a partial, perspective view similar to that of FIG. 3 showing a user of the exercise device;

[0018] FIG. 7A is a partial, perspective view similar to that of FIG. 4 showing a user of the exercise device without the handle system being used;

[0019] FIG. 7B is a partial, perspective view similar to that of FIG. 4 showing a user in the supine position of the exercise device without the handle system;

[0020] FIG. 7C is a partial, perspective view similar to that of FIG. 4 showing a user of the exercise device with the handle system.

## DETAILED DESCRIPTION OF THE INVENTION

[0021] As will be readily apparent to those skilled in the art, the present invention may be produced in other specific forms without departing from its spirit or essential characteristics. The present embodiment, is therefore, to be considered as illustrative and not restrictive, the scope of the invention being indicated by the claims rather than the foregoing description, and all changes which come within the meaning and range of the equivalence of the claims are therefore intended to be embraced therein. Reference will now be made in detail to various exemplary embodiments of the present invention, examples of which are illustrated in the accompanying drawings wherein like numerals indicate the same elements throughout the views and numbers with the same final two digits indicate corresponding elements among embodiments. It should be understood that the present invention can be adapted for any other uses and applications to exercising or performing functional tasks while exercising.

[0022] Referring now to the drawings and first to FIGS. 1, 2, 3 and 4, an exercise device constructed in accordance with the present invention is shown generally at 10 which may be supported from the ceiling structure of an exercise room as shown in FIG. 1, or which may be supported by a framework of legs that is assembled to the floor structure of a building or to the ground for outdoor use (not shown). The exercise device 10 incorporates an upper frame 11 which as shown consists of three beams 14-16 on which

is located a multitude of frame connectors 17 which are evenly spaced. The frame connectors 17 consist of eye-hooks or U-shaped devices fixedly attached to the beams.

As shown in FIG. 1, the exercise device 10 may be connected to any suitable structure for support thereof. The exercise device 10 may be connected to the ceiling with a plurality of threaded fasteners 98 through a plurality of apertures 99 through the upper frame 11. The exercise device 10 is elevated to any suitable level above the floor or ground 19 in order for a user 20 to have free range of motion horizontally and vertically. In the embodiment shown in FIG. 1, there are three workout stations 30, 50, 70.

[0023] FIG. 2 illustratively depicting the first workout station 30 comprises a first harness assembly 31 to be worn by a user 20 beneath the upper frame 11. The first harness assembly 31 consists of a modified mountain climbing harness conveniently composed of high-strength fabric strap material such as nylon with a rigid D-ring 35 located on the back of the harness assembly and a multitude of harness connectors 37. An anchor box 41 comprising a rigid U-shaped apparatus extends upward approximately two feet. The anchor box 41 is fixedly attached to the D-ring 35 and to the harness connectors 37. The upwardly extending arms of the anchor box 41 are attached to a stopper 42 which may be covered with foam or other sound and impact absorbing material 43. The stopper 42 is fixedly attached to a plate 46 to which attached are downward extending resilient members 44 which are shown as a set of five springs as shown in FIG. 2A. The resilient members 44 may be housed in tubes 45 to prevent entanglement of a plurality of resilient members 44. The length of the resilient members 44 extending beyond the tubes 45 incorporate a plate 46 which serves as a safety device to slow the user 20 down if the vertical upward movement is too rapid. The resilient members 44 are connected to the upper frame 11 by the frame connectors 17 on beam 14.

[0024] FIG. 3 illustratively depicting the second work out station 50 comprises a second harness assembly 51 to be worn by a user 20 beneath the upper frame 11. The second harness assembly 51 consists of a mountain climbing harness conveniently composed of high-strength fabric strap material such as nylon with harness connectors 57. Two

flexible lines 61, 62 are attached to the harness connectors 57 and extend upward toward the upper frame 11. A series of block and tackle pulley systems 53 are attached to the upper frame 11 by the frame connectors 17. The pulleys 53 can provide any even mechanical advantage including a 2-to-1, a 4-to-1, or an 8-to-1 mechanical advantage. The flexible lines 61,62 operatively disposed to the pulleys 53 are sufficiently resistant to stretching so that the user 20 when standing erect on a vertical surface 18 and is coplanar with the ground/floor 19 does not become significantly off balance. The flexible lines 61, 62 pass through a mountain climbing ascender 58 and a mountain climbing descender 59 other suitable brake device may be secured to the upper frame structure 11 as shown so as to establish a controllable breaking relationship with the hoisting line and to prevent user 20 from free falling. The flexible lines 61, 62 extend downward and are operatively disposed to a floor-mounted pulley 54. The flexible lines 61, 62 terminate at grasping handles 63, 64 which a spotter can grasp and perform a two-handed seated row pull exercise to hoist user 20 up the vertical surface 18. A safety membrane (not shown) may be suspended from the upper frame 11 in a horizontal plane parallel to the floor positioned beneath the block and tackle pulley system 53 to prevent hair and appendages from coming into contact with the pulley system 53. The upper frame connectors may be attached to a sliding system 100 comprising the beam 15 and a track 101 in which the frame connectors 17 freely move in a horizontal planar direction as shown in FIG. 3A.

[0025] FIG. 4 illustratively depicting the third workout station 70 comprises a cradle system 71 made up of a rigid seat 73 and a backrest 74 conveniently composed of high-strength fabric having a bottom end 75 and a top end 76 hingedly attached by the bottom end 75 to the back of the seat 73. An elastic cord 79 attaches to the top end 76 and extends upwardly to the upper frame 11 and beam 16 and is connected at the frame connector 17. The elastic cord 79 has a limited elasticity that only stretches to a maximum length so as to allow the user 20 to recline to a supine position while positioned on the rigid seat 73. Two vertical members 81, 82 are connected to the seat 73 by cradle connectors 77 and extend upwardly to the upper frame 11 and connected by the frame connectors 17.



[0026] Co-located with the cradle system 70 is a handle system 90 comprising a pair of flying rings 91,92. Each ring 91, 92 has a handle connector 93, 94 which is connected to a support member 95,96 extending upwardly to the upper frame 11 and connected via the frame connectors 17. The support members 95, 96 can be connected to the same frame connectors 17 as the vertical members 81, 82.

[0027] The exercise device of the current invention may be used in a variety of exercises. One embodiment of a basic method, see FIG. 5, that allows a user 20 to perform functional task during training or exercise using the exercise device 10 would be to first secure the user with the first harness assembly 31 and the anchor box 41. The harness assembly 31 may be of a variety of embodiments as previously stated, but is basically adapted to be worn by the user 20. Attach the upwardly extending arms of the anchor box 41 to a stopper 42. Attach the stopper 42 to a predetermined number of downward extending resilient members 44 to establish an adequate amount of vertical force. Again, both the resilient members 44 and the upper frame 11 may have connectors for attachment. The height of the upper frame 11 should be predetermined so that the user 20 is located substantially beneath the upper frame 11 and allows for the vertical height of the anchor box 41 and the desired vertical distance the user 20 shall move. Typically, the user 20 will be in the center of the beam 14 and will be capable of moving and jumping about beneath the upper frame 11 (see dotted lines in Figure 5). The user 20 would then be prepared to perform the functional task or tasks. These tasks may be part of a training exercise program to include but are not limited to side-lunges, 2-and-1 legged lunges, reverse lunges, frog jumps, sumo dead lifts, knee lifts, mid-air hand-to-toe touches and other exercise programs as might be designed by one skilled in the art. Exercises performed by user 20 primarily target the gluteus, quadriceps, hamstrings, calves, hip abductor, adductor, and iliopsoas muscle groups.

[0028] The second step of one embodiment of a basic method, see FIG. 6, that allows a user 20 to perform functional task during training or exercise using the exercise device 10 would be to first secure the user with the second harness assembly 51. The harness assembly 51 may be of a variety of embodiments as previously stated, but is basically

adapted to be worn by the user 20. Attach the two flexible lines 61, 62 to the harness connectors 57 and operatively dispose the flexible lines through a series of block and tackle pulley systems 53 and the floor mounted pulley 54. The flexible lines 61, 62 terminate at grasping handles 63, 64 which a spotter can grasp and perform a two-handed seated row pull exercise to hoist user 20 up the vertical surface 18. Again, both the flexible line and the upper frame 11 may have connectors for attachment. The height of the upper frame 11 should be predetermined so that the user 20 is located substantially beneath the upper frame 11 and allows for the installation of a safety membrane (not shown) and the desired vertical distance the user 20 shall move. Typically, the user 20 will be in the center of the beam 15 and will be capable of moving horizontally about beneath the upper frame 11 on the vertical surface 18 (see dotted lines and directional arrows in Figure 6). The user 20 and the spotter would then be prepared to perform the functional task or tasks. These tasks may be part of a training exercise program to include but are not limited to an aerobic workout by running horizontally back and forth across the vertical surface 18 while suspended in the air by the second harness assembly 51. The spotter pulls on the ends of the flexible line 61, 62 while in a seated rowing position and aids the user 20 up the vertical surface 18. Exercises performed by user 20 and spotter primarily target the muscle groups including but not limited to latissimus dorsi, trapezius, rhomboids, teres major and minor, deltoids, infraspinatus, brachialis, brahrioradialis, pectoralis major, sternal and erector spinæ and muscles used in other exercise programs as might be designed by one skilled in the art.

[0029] The third step of one embodiment of a basic method, see FIG. 7A, that allows a user 20 to perform functional task during training or exercise using the exercise device 10 would be to first seat the user within the cradle system 70. The cradle system 70 may be of a variety embodiments as previously stated, but is basically adapted to be a rigid seat 73 with a flexible backrest 74 in which the user 20 is seated comfortably. Attach the two vertical members 81, 82 to the seat extending upward to the upper frame 11 and secured via the frame connectors 17. Attach an elastic cord 79 to the back 74 and to the frame connector 17. Again, both the vertical members 81, 82, the elastic cord 79, and the upper frame 11 may have connectors for attachment. The elastic cord 79 has a predetermined

elasticity that only stretches as far as to allow the user to recline in the seat 73 to a supine position, see FIG. 7B. User 20 to perform abdominal exercise while seated in seat 73 with 45 degree angle position with legs extended and supine position with back resting in backrest 74 and legs extended performing various crunches such as bicycle crunches, scissor switches and double crunches. Also, V-sit exercises require the user 20 to sit with back erect, knees bent and legs raised to 45 degree angle, hands are anchored behind thighs, alternating between legs outstretched and straightened. Exercises performed during this activity target the rectus abdominis, external and internal obliques, transverse abdominals and erector spinae. The height of the upper frame 11 should be predetermined so that the user 20 is located substantially beneath the upper frame 11 and allows for the desired vertical distance the user 20 shall move. Typically, the user 20 will be in the center of the beam 16 (see generally Figure 7A, 7B, and 7C ). FIG. 7C shows the user 20 also performing various abdominal exercises while locking arms and bearing weight down on a pair of flying rings 91,92. Each ring 91, 92 has a handle connector 93, 94 which is connected to a support member 95,96 extending upwardly to the upper frame 11 and connected via the frame connectors 17. The rings 91, 92 are positioned parallel to the waist of the user 20 and at a predetermined height above the seat 73. User 20 bears downward on rings 91, 92 causing the lifting of the buttocks and legs inches off seat 73 and user 20 then performs inward knee bends and horizontal scissor kicks. The muscle groups used are the triceps, forearm, biceps , deltoids, infraspinatus, teres major and minor as well as the rectus abdominis, external and internal obliques, transverse abdominals and erector spinae. These tasks may be part of a training exercise program or other exercise programs as might be designed by one skilled in the art.

[0030] While certain specific materials and arrangements have been detailed in the above description of exemplary embodiments, these may be varied, where suitable, with similar results. For example, while a steel upper frame is preferred, the upper frame may be formed from any suitable material such as wood, plastics, fiberglass, composite materials, or combinations of these or other materials.

[0031] Having shown and described the preferred embodiments of the present invention,

further adaptations of the exercise device of the present invention as described herein can be accomplished by appropriate modifications by one of ordinary skill in the art without departing from the scope of the present invention. Several of these potential modifications and alternatives have been mentioned, and others will be apparent to those skilled in the art. For example, while exemplary embodiments of the inventive system and process have been discussed for illustrative purposes, it should be understood that the element described will be constantly updated and improved by technology and advances. Similarly, as described, the exercise device of this invention could be applied with just about any user or accessory exercise or athletic equipment such as a trampoline or a ball. Accordingly, the scope of the present invention should be considered in terms of the following claims and is understood not to be limited to the details of structure, operation, or process steps as shown and described in the specification and drawings.